San Juan and Animas Rivers Diversion Study

Responses to Review Comments

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and

San Juan River Basin Recovery Implementation Program

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Page	Commenter	Tom Pitts 7/21/16
iii	Comment	**Table of Contents - The fonts used for the appendices are so small as to be unreadable. Need less info on a page and larger font.**
	Response	*Originally, the appendices were going to be distributed separately from the body of the report. One of the reasons we were going to do that was to ensure that the size of the document was not so large as to limit the ability to distribute it electronically. We have now made several changes so that as much of the information as possible is now presented in the document as opposed to stand-alone appendices.* *The FINAL document is composed of two parts (two separate pdf files each about 13 MB). Part 1 is the report and Appendices A and B. Part 1 now contains all information (all appendices) except for the large-scale aerial photographs of diversion sites. Those maps (Appendix C) are Part 2 (of 2) of the final report.* ***Regarding the inclusion of Appendix A in the final version of the document and the small size of the print:*** *We modified Appendix A (removing rows, editing text, and enlarging the font as much as possible) so that we could get that appendix into the report. While the printed text is very small, it is readable and very visible on screen at 125-200%. Presenting the information in this fashion was the only meaningful way that this appendix could be presented. Readers of the document will still have the option of accessing the excel file used to generate Appendix A.* *Appendix B (ground level photographs of diversion structures) is also included in part 1 of the FINAL version of the report. Appendices D and E from the draft version of the report (volume of water diverted) have been reconfigured and are now included in the RESULTS section of the final report. Information used to generate these tables as well as the daily volumes of water diverted are still available as an excel file. The excel spreadsheets being provided as project deliverables to the USBR will also be available to everyone via download at the Program website.*
Page	**Commenter**	Tom Pitts 7/21/16
iv	Comment	**Executive Summary - The goals of study are unclear, given the content of the report (see comments below). The Executive Summary and the "Study Objectives' need to incorporate the following from the 'Assessments" section: "The goal of the stocking location analysis done for this study is not to question that success, rather it is to provide information that may help to guide future stocking efforts. For example, this study may prove useful in helping to determine seasonality of stocking efforts, or assist in determining if certain stocking locations may be preferable for either Colorado Pikeminnow or Razorback Sucker based on post-stocking movement." This appears to be the primary benefit and goal of this study.**
	Response	*The goals of the study and their evolution are now clearly stated in the report. Study objectives developed by the USBR and subgroup members are also included. A version of the above statement regarding "stocking location analysis" has also been included.*

Page	Commenter	Tom Pitts 7/21/16
v	Comment	**The Executive Summary needs to include the succinct and specific statement of conclusions and recommendations discussed in comments on the "Assessments" recommended below, which are absent from this report. The Executive Summary and the Methods section needs to include a discussion of the limitations and errors of the methodology applied (see comments below), which need to summarized in the Executive Summary. As discussed below, the methodology significantly overestimates the percentage of river flow entering diversions.)**
	Response	*The report's Method's section now includes additional discussion about the calculation methodology limitations.*
Page	**Commenter**	Tom Pitts 7/21/16
1	Comment	**Introduction - This entire section deals with citations regarding entrainment in other river basins and potential entrainment in the San Juan River. It is not related to the goals of the study. The introduction should be related to the purpose of the report, which is at all not clear. However, Program participants have been told that this is not an entrainment study.**
	Response	*We have rewritten most of the Introduction and focused it on the Colorado River Basin, Upper Colorado River Basin, and San Juan River Basin. Pertinent literature from these areas are now included in the rewritten Introduction. We have also cited the pertinent documents that lead to undertaking of this study.* *The comment* **"However, Program participants have been told that this is not an entrainment study."** *is correct and we contend that this is not an entrainment report. Renfro et al. (2006) was a San Juan River fish entrainment study that presented original research. Renfro et al. (2006) contained detailed information on the ichthyofaunal composition of selected canals (2006–2008) based on sampling by the authors. In addition, that report also presented original information on the longitudinal distribution of fish in the canal as well as their seasonal distribution and abundance. That work and report has been cited by the Program as an example of type study that would be need to be conducted in other canals if fish entrainment data were deemed necessary. Comparison of our 2016 San Juan and Animas rivers Diversion Study final report to Renfro et al. 2006 reveals the distinct and significant differences between the two documents in both scope and content and demonstrates that our 2016 work is not a San Juan River Basin entrainment study.* *A new section HISTORY OF MODIFICATION OF THE SAN JUAN AND ANIMAS RIVERS DIVERSION STUDY has been added to the report (after INTRODUCTION) that chronicles the history associated with changes in its scope of work, study objectives, study title, and decisions that were made regarding these matters. In addition, we clarify the differences between an entrainment study and a diversion study in the context of the current effort.*

Page	Commenter	Tom Pitts 7/21/16
1	Comment	**Introduction - The following paragraphs need to be deleted or made relevant to the purpose(?) of the study. If kept the text, the paragraphs need to be moved to a separate section and fully qualified with respect to the goals of the study. The studies cited below apparently deal with entrainment of LARVAL fish. The information needs to be qualified with respect the goals of the study. The Intro needs to be related to the purpose of the study.**
	Response	*We mention that entrainment is possible for various life stages. The Long Range Plan states that entrainment of any life stage is a recognized threat to the recovery of endangered fishes in the San Juan Basin (Goal 2.4, 2015 SJRBRIP Long-Range Plan.*
Page	**Commenter**	Tom Pitts 7/21/16
1	Comment	**Introduction – Report states *"Stamp et al. (2005) examined two main channel San Juan River diversion structures that might adversely affect endangered fish movement and thereby inhibit recovery efforts. Their work specifically addressed issues of passage at the Fruitland Diversion (RM 178.5) located on the western edge of Farmington, NM near the mouth of the La Plata River and the Arizona Public Service (APS) Company diversion (RM 163.3), also known as the Four Corners Power Plant Diversion. This latter diversion is located approximately midway between Farmington and Shiprock, NM. The study goals were to quantify physical and hydraulic characteristics upstream, downstream, and at the diversion structures, and determine if and when the structures hinder or eliminate fish passage (Stamp et al. 2005)".*** **This study should not be cited. It is irrelevant to the report.**
	Response	*Because it was decided during the Jan 4th 2016 conference call with the BC subgroup and Recovery Program stakeholders to not consider fish passage for this study, this paragraph has been removed. The citation is relevant in other sections of the report and therefore remains in the Literature Cited section.*
Page	**Commenter**	Tom Wesche 7/25/16
1	Comment	**Introduction - Either add Goals and Objectives following this paragraph or add a connecting paragraph here that leads into the Goals and Objectives chapter. This linking paragraph needs to describe what the SJR problem is, if any, and why this study was felt needed.**
	Response	*A paragraph was added to address this. While the issue of entrainment has never been fully quantified for either the San Juan or Animas rivers, it was noted that the SJRBRIP Long-Range Plan lists eight specific tasks that address entrainment on both the San Juan and Animas Rivers. This study is a first step in addressing some of those Long-Range Plan tasks.*

Page	Commenter	Tom Pitts 7/21/16
2	Comment	**Study Goals and Objectives – suggested change: "The goal of this study was to assess whether agricultural, municipal, and industrial surface water diversions within the study area warrant further investigation of entrainment risk of native fish and to develop recommendations regarding stocking locations on the San Juan River with respect to the location of diversion structures. (See Comment below. Is this part of the goal??)"**
	Response	*The project goals and objectives have been clarified to state: "The goal of this study is to compile relevant information for the Recovery Program's use in: 1) identifying municipal, agricultural, and industrial diversions along the Animas and San Juan Rivers that warrant further investigation of native fish entrainment potential; and 2) developing recommendations regarding stocking locations on the San Juan River with respect to the location of diversion structures. The relevant information includes a complete listing diversion sites and their physical features, available diversion records and estimates of diversion as a percent of total river flow for each diversion, and native fish movement distances from stocking locations relative to the diversions. We obtained quantitative information on fish distribution and abundances from SJRBRIP monitoring data and other previous studies in the San Juan River Basin. The study area includes: 1) the Animas River from Durango, CO, downstream to its confluence with the San Juan River; and 2) the San Juan River from Navajo Reservoir downstream to Lake Powell. No data on fish in the river or in diversions was collected as part of this study."*
Page	**Commenter**	Tom Pitts 7/21/16
3	**Comment**	**Study Area - Critical habitat for endangered fish needs to be identified on the figure.**
	Response	*Good point. Figure 1 (study area) has been revised to identify the reach of the San Juan River that has been designated as Critical Habitat for Colorado Pikeminnow and Razorback Sucker.*
Page	**Commenter**	Tom Pitts 7/21/16
4	**Comment**	**Study Area - The Animas-La Plata Project does not pump large amounts of water everyday throughout the year. The statement does not portray the operations correctly and in fact the project will not pump to its capacity until water is available and when the reservoir levels are low. The currently operation is to pump evaporation and seepage loss per year during the spring run off or high flows.**
	Response	*The text has been revised to state: "There are numerous diversions on the Animas River in NM and CO. The largest diversion is the Animas-La Plata Project, completed in 2008 by the USBR, which diverts water from the Animas River near Durango, CO, and pumps it to Lake Nighthorse. The Animas-La Plata Project does not currently divert water from the Animas River on a daily basis. Instead water is diverted during spring runoff or other periods of high flow to offset Lake Nighthorse evaporative and seepage losses and maintain reservoir storage level."*

Page	Commenter	Tom Pitts 7/21/16
6	Comment	**Methods/Description of Flow Data Collected for Each of the Study Sites A better description of methods and data used is needed. Does this include provisional diversion data collected by New Mexico. See comment on provisional data below.**
	Response	*In response to your specific question:* **"Does this include provisional diversion data collected by New Mexico?"** *The New Mexico Office of State Engineer (NMOSE) qualifies hydrologic data on their website as "provisional and subject to revision". Given that stipulation, the answer to your questions is "Yes" as any hydrologic data obtained from New Mexico Office of State Engineer is by default, provisional.* *In an attempt to clarify confusion that might be the result of the use of "provisional" data, we have rewritten a portion of the Methods.* *The following revised text has been added to the report in an attempt to capture important caveats with the hydrologic data provided by the Colorado Division of Water Resources and the New Mexico Office of the State Engineer:* • *Daily average diversion records from 2005-2015 for most of the Colorado agricultural diversions included in the study were obtained from the Colorado Division of Water Resources' online database (Colorado's Decision Support System; http://cdss.state.co.us/Pages/CDSSHome.aspx). The agency does not specifically qualify the data as provisional and subject to change, though agency's website does list the Terms of Use, which includes a Liability Disclaimer.* • *Daily average diversion records from 2011 to 2015 for most of the New Mexico agricultural diversions included in the study were obtained from the NMOSE online database (http://meas.ose.state.nm.us/district5.jsp). Older diversion records (2005-2010) for these diversions were then obtained from NMOSE staff. For many ditches on the Animas River in New Mexico, diversion data was not available for the 2011 calendar year. On their website, the NMOSE qualifies the available data as "provisional and subject to revision".*
Page	**Commenter**	Tom Pitts 7/21/16
7	Comment	**Methods/ Methods Used for Synthesis & Analysis of Flow Data by Canal** **The criteria for identifying diversions that may warrant further investigation is as follows:** **1. Endangered fish are resident upstream of the diversion. The remaining criteria need to be specified** **Statements are made regarding stocking locations and the goal of moving those locations. What are the criteria? What is the rationale for any criteria? What ARE the goals and objectives of this report?)**
	Response	*The Study Goals and Objectives section has been revised to clarify that:* *"Based on input from Recovery Program stakeholders during three project meetings (held on August 5th, 2015 and on November 3rd, 2015), and reiterated in the January 4th, 2016, project meeting, ASIR and TNC were directed by the USBR and the Recovery Program to not complete tasks in the original scope of work related to objectives #1 and #6, above. Specifically,*

	Response	*the tasks to not be performed as part of the study included:* *• Identification of specific features among diversion sites where entrainment and/or impingement could be a potential threat to endangered fish; and* *• Entrainment risk prioritization among diversion sites."*
Page	**Commenter**	Tom Pitts 7/21/16
7	**Comment**	**Methods/ Methods Used for Synthesis & Analysis of Flow Data by Canal** **Water users cannot reproduce the numbers in the appendices regarding the APS diversion. How were these numbers calculated?)**
	Response	*Additional detail about the calculation methodology is now included in this section. In addition, TNC plans to meet with Tom Pitts and water users to explain the calculation methodology. We will work with everyone, even after the end of the contract, to ensure calculations are correct and can be duplicated.*
Page	**Commenter**	Tom Pitts 7/21/16
8	**Comment**	**Methods/ Methods Used for Synthesis and Analysis of Flow Data by Canal –** **The estimates of percent of river flow diverted are overestimated. The overestimate increases significantly with distance between the gage and the diversion, as return flows and tributary inflows are not accounted for.**
	Response	*Depending on the river inflows and depletions between the nearest USGS gage and the diversion - the quantification of which was not in the scope of this study - the estimates of diversion as a percent of total river flow may be overestimates or underestimates. Despite the limitations of the approach to developing estimates of diversion as a percent of total river flow (agreed to by the BC subgroup on August 5th, 2015, for this study), the BC subgroup agreed that the study's estimates of diversion as a percent of total river flow, especially when combined with the field data collected at each diversion site and the fisheries data, would be useful when combined with other information to identify diversions that may warrant further investigation by the Recovery Program.*
Page	**Commenter**	Tom Pitts 7/21/16
8	**Comment**	**Methods/ General Methodology for Fish Capture Data - Based on the data, there appears to be NO discernable impacts of diversions on the fishery. If true, so state and include in the suggested "Conclusions" section below.**
	Response	*The impacts to fishery are unknown. There has been no effort to quantify entrainment of fishes in the majority of diversions examined.*
Page	**Commenter**	Tom Pitts 7/21/16
8	**Comment**	**Methods/ General Methodology for Fish Capture Data - Tables 1, 2, and 3 summarize the data from the Animas. Where is similar data for the San Juan displayed in this report?**
	Response	*The summary of the fish community data for the Animas River was presented because during the period of record examined Colorado Pikeminnow and Razorback Sucker have not been collected. If they had been collected in the Animas River, the Animas River fisheries data would have focused solely on the two endangered species. Conversely, the San Juan River database*

		allowed for presentation of a robust dataset for both Colorado Pikeminnow and Razorback Sucker. Therefore the presentation of the entire SJR fish community dataset was not included as it was not the focus of this study.
Page	**Commenter**	Tom Pitts 7/21/16
13	**Comment**	**Methods/Movement Data for Razorback Sucker - How was movement data used to identify diversions warranting further investigation? Please identify all the criteria for identifying those diversions and how the data in this report was used to do so.**
	Response	*The Study Goals and Objectives section has been revised to clarify that:* *"Based on input from Recovery Program stakeholders during three project meetings (held on August 5th, 2015 and on November 3rd, 2015), and reiterated in the January 4th, 2016, project meeting, ASIR and TNC were directed by the USBR and the Recovery Program to not complete tasks in the original scope of work related to objectives #1 and #6, above. Specifically, the tasks to not be performed as part of the study included:* *•Identification of specific features among diversion sites where entrainment and/or impingement could be a potential threat to endangered fish; and* *•Entrainment risk prioritization among diversion sites."*
Page	**Commenter**	Tom Pitts 7/21/16
15	**Comment**	**Methods/Movement Data for Razorback Sucker - How were current stocking locations used to identify diversions warranting further investigation or otherwise used?**
	Response	*Same response as above.*
Page	**Commenter**	Tom Pitts 7/21/16
15	**Comment**	**Results - What does 'pertinent' mean? Are there diversions that are not pertinent?**
	Response	*The term "Pertinent" was used in the original USBR RFP. The text has been revised to simply state "diversions".*
Page	**Commenter**	Tom Pitts 7/21/16
22	**Comment**	**Results/Animas River Diversions/ RM 163.7 APS Four Corners Units 4 & 5 - Incorrect. The mesh is not this small. Please verify.**
	Response	*In a 8/19/16 phone call, Richard Grimes of APS told Dale Lyons that the mesh opening is approximately 1 x 3 inches (or approximately 2.5 x 7.5 cm). We have verified this information.*
Page	**Commenter**	Tom Wesche 7/25/16
23	**Comment**	**Results/Longitudinal Synthesis of Diversion volumes and Percent of River Diverted - Within this section, can you add up the "% diverted'" for the various gages and diversions for specific times and see if over 100% of the river was diverted? This might give a little insight into the relevancy of these calculations.**
	Response	*The commenter is simply adding up the lowest percentages listed from different years and different diversions to get a total of about 120%, somehow suggesting that this proves the estimates are wrong. On it's face, this comment/observation doesn't make sense because: 1) it ignores what's potentially happening in the river between diversions (i.e. the river gaining or*

		losing flow from returns or diversions, respectively); 2) those data from different USGS gages were used to calculate the estimates for different diversions; and 3) it fails to recognize that you can divert, say, 50% of a river at an upstream location, and divert 50% of the remaining river flow at a downstream location, and still retain water in the river. Summing values from different years is even more problematic because it ignores changes in runoff/discharge magnitude of different water-years.
Page	**Commenter**	Tom Pitts 7/21/16
23	**Comment**	**Results/Longitudinal Synthesis of Diversion volumes and Percent of River Diverted - Water interests cannot replicate the numbers re: % diverted.**
	Response	*Additional detail about the calculation methodology is now included in this section. In addition, TNC plans to meet with Tom Pitts and water users to explain the calculation methodology.*
Page	**Commenter**	Tom Pitts 7/21/16
23	**Comment**	**Results/Longitudinal Synthesis of Diversion volumes and Percent of River Diverted - Using the lowest percentages above, about 120% of the gaged flow in the Animas is diverted. Presenting this data without qualification or explanation is unacceptable. An explanation is needed re: the fact that the percentages diverted are significantly overestimated and why. Same comment applies to the San Juan.)**
	Response	*This comment is addressed above. The Methods section has been revised to provide additional description of the calculation methodology is included and to clarify that in the cases of the NMOSE data, the data is qualified by the agency as "provisional and subject to change".*
Page	**Commenter**	Tom Pitts 7/21/16
24	**Comment**	**Results/ Longitudinal Synthesis of Diversion volumes and Percent of River Diverted - (Comment: How were the 10% and 20% screening criteria selected? What is the significance/relevance of 10% and 20%? The implication from the data is the more than 100% of the annual flow is diverted. Yet there are significant endangered and nonnative fish populations in the river. What does this say about the limitations of this methodology? The limitations of the methodology need to be addressed in this report. As indicated in other comments, the data is questionable and needs checking. Explanation is needed re: the difference between gaged data and river flow miles from the gage, giver return flows and tributary inflows. It needs to be stated that the calculations based on gaged flow greatly overestimate the percentage of actual river flow being diverted, a significant flaw in the methodology. The error is magnified (probably exponentially) by the distance between the gage and the diversion. The APS diversion is 15.7 miles from the nearest gage. Otherwise it appears that the rivers are dried up or almost so, which is not the case.)**
	Response	*The results related to diversions with estimated diversion above 10% and 20% of total river flow have been removed from the Results section. Depending on the river inflows and depletions between the nearest USGS gage and the diversion - the quantification of which was not in the scope of this study - the estimates of diversion at a percent of total river flow may be overestimates or underestimates. Despite the limitations of the approach to*

		developing estimates of diversion as a percent of total river flow (agreed to by the BC subgroup on August 5th, 2015, for this study), the BC subgroup agreed that the study's estimates of diversion as a percent of total river flow, especially when combined with the field data collected at each diversion site and the fisheries data, would be useful when combined with other information to identify diversions that may warrant further investigation by the Recovery Program. Regarding the comment about compounding depletions: this comment: 1) ignores what's potentially happening in the river between diversions (i.e. the river gaining or losing flow from returns or diversions, respectively); 2) ignores that data from different USGS gages were used to calculate the estimates for different diversions; and 3) it fails to recognize that you can divert, say, 50% of a river flowing at 2,000 cfs at an upstream location, and divert 50% of the remaining 1,000 cfs at a downstream location and maintain 500 cfs within the river. Summing values from different years is even more problematic because it ignores changes in runoff/discharge magnitude of different water-years.
Page	**Commenter**	Tom Pitts 7/21/16
25	**Comment**	**Results/ Summary of Longitudinal Distribution of Endangered Fishes by Life Stage and Season in Reference to Pertinent Diversion Points - How is the data presented in this section applied to identify diversions that warrant further investigation?**
	Response	*The Study Goals and Objectives section has been revised to clarify that: "Based on input from Recovery Program stakeholders during three project meetings (held on August 5th, 2015 and on November 3rd, 2015), and reiterated in the January 4th, 2016, project meeting, ASIR and TNC were directed by the USBR and the Recovery Program to not complete tasks in the original scope of work related to objectives #1 and #6, above. Specifically, the tasks to not be performed as part of the study included:* *•Identification of specific features among diversion sites where entrainment and/or impingement could be a potential threat to endangered fish; and* *•Entrainment risk prioritization among diversion sites."*
Page	**Commenter**	Tom Wesche 7/25/16
25	**Comment**	**Results/ Summary of Longitudinal Distribution of Endangered Fishes by Life Stage and Season in Reference to Pertinent Diversion Points - Fish data should be presented here, not in Methods section. What is the timing of fish movements and how does that relate to diversion times? How about spawning times?**
	Response	*We agree with your suggestion that the fish data should be in Results (not in Methods) and should mirror the diversion location tables. Summaries of the San Juan River and Animas River diversion locations and fisheries data are presented in separate tables. There are three tables for Animas River Diversion Sites (Reaches 1–3) and three tables for the Animas River Diversion fisheries data (Reaches 1–3). San Juan River Diversion sites are now summarized in a single Table, as is the San Juan River fisheries (i.e. endangered species density) data.*

		We do not have sufficient information to relate the timing of fish movement to periods of diversion. We have added a paragraph to the discussion that relays the limitations of the movement data. Successful spawning by both Colorado Pikeminnow and Razorback Sucker species has been documented during periods in which diversions have been operational. This is now noted in both Results and Discussion.
Page	**Commenter**	Tom Pitts 7/21/16
28	**Comment**	**Results/ Summary of Longitudinal Distribution of Endangered Fishes by Life Stage and Season in Reference to Pertinent Diversion Points? Table 8 - How was this data used in the report?**
	Response	*The data is presented to address final study objective #5, "Synthesize information on diversion structures including proportion of flow diverted, amount of screening currently present, proximity to stocking locations, quality of habitat upstream of diversion and other metrics as identified by the SJRIP biology committee and the interested parties workgroup." Fisheries data was deemed to fall within the "other metrics" category.*
Page	**Commenter**	Tom Pitts 7/21/16
30	**Comment**	**Discussion/ This assessment and discussion needs to be preceded or followed by a "Conclusions" section and a "Recommendations" section that are tightly tied to the data in the report and yet to be defined goals and objectives for the report. If there are specific diversions that warrant further investigation, those need to identified based on as yet unspecified criteria for identifying those diversions. The fact that the stocking programs have succeeded with the existing diversions being operational on the San Juan needs to be addressed.)**
	Response	*The clarification of the goals and objectives has been addressed above. Similarly, the reasons for not identifying specific diversion structures for future study have also been addressed. The success of the stocking programs was noted in the first sentence of paragraph 2 within the Discussion; "Several monitoring programs currently being conducted for the SJRBRIP have, through a variety of metrics, documented the success of the current augmentation programs for Colorado Pikeminnow and Razorback Sucker in the San Juan River." Additional verbiage that acknowledges the success of the augmentation programs while diversions have been in place and operational has been added to the Discussion.*
Page	**Commenter**	Tom Pitts 7/21/16
30	**Comment**	**Discussion/ Insert the following statement; "Currently, there is an active augmentation program for the Colorado Pikeminnow and Razorback Sucker in the San Juan River mainstem."**
	Response	*Those changes have been made and are in the final report.*

Page	**Commenter**	Tom Pitts 7/21/16
30	**Comment**	**Discussion/ Insert the following statement; ", however, this was not investigated as part of this effort."**
	Response	*That change has been made to the final report.*
Page	**Commenter**	Tom Pitts 7/21/16
30	**Comment**	**Discussion/ If this (*providing information that may help guide stocking efforts*) is a goal of the report, which it apparently is, the goal needs to be stated at the beginning of the report.**
	Response	*This was not a stated goal of the project. Through the execution of the scope of work, it was recognized that the information being compiled had inherent value to the Recovery Program, and was therefore included in the report. As stated in the report, the development of recommendations regarding stocking locations is a Recovery Program activity. It is outside the purview of the contractors to make suggestions regarding the stocking of endangered species within the study area.*
Page	**Commenter**	Tom Pitts 7/21/16
30	**Comment**	**Because current management actions do not include augmentation efforts on the Animas River, the lack of endangered species on the Animas River, and no designated critical habitat on the Animas, no further study is warranted of infrastructure improvements to mitigate entrainment risk on the Animas River**
	Response	*For clarification, it should be noted that stocking (augmentation) of both Colorado Pikeminnow and Razorback Sucker does occur in the Animas River, albeit in the lowermost reach of the river (RM 4.0 and RM 1.0). Should the SJRBRIP expand Animas River augmentation efforts, investigation of those structures that pose the greatest entrainment risk might be warranted.*
Page	**Commenter**	Tom Pitts 7/21/16
30	**Comment**	**This statement fails to recognize that stocking Razorback sucker and Colorado pikeminnow has produced a substantial adult population that is spawning in the San Juan River with these diversions in place and operational.**
	Response	*The success of the augmentation programs while these diversions have been in place and operational is not questioned. As noted above, several studies using various metrics have documented that success. However, the success of the augmentation programs does not equate to zero impact on the two endangered species as a result of diversion practices.*
Page	**Commenter**	Tom Pitts 7/21/16
30	**Comment**	**Discussion/ Succinct and specific statements of conclusions and recommendations are much needed related to the goal of the report and its content. The hazy statements in the paragraph above do not do justice to the effort that went into the report with respect to the inventory of facilities & analysis with respect to flow versus diversion. The authors need to identify those specific structures on the San Juan River that "may warrant further investigation" and the justification regarding those specific structures. The specific studies that might be needed as part of further investigation need to be identified.)**

	Response	*Those diversions that divert the highest proportion of river flow, located near current stocking locations, and in areas of naturally high densities of endangered species, may be structures that warrant further investigation. The studies necessary to assess entrainment risk at a particular diversion site would not necessarily be the same for each diversion structure. Physical characteristics such as the presence or absence of screens, length of diversion channel, number and location of returns to the river, and previous mitigation efforts (e.g. the fish passage at the PNM diversion and the weir wall at the Hogback diversion) would be among the factors considered for a specific assessment of a diversion structure. The determination of which, if any, of the diversions that may warrant further investigation was determined, by the BC subgroup and Recovery Program stakeholders, to be the purview of the SJRBRIP and not by the authors of this report.*

Commenter	Mathew Zeigler, NM Department of Game and Fish 7/29/16
Comment	**The "San Juan and Animas rivers diversion study" draft final report is well thought out and organized, and as currently written, gives the Program a good overview of the diversions on both the San Juan and Animas rivers. The only fallacy in the study was the exclusion of Objectives 1 and 6 (page 3). Although it is mentioned that the reasons for excluding these two objectives is discussed in the Methods section, I could find no explanation as to why these objectives were removed. These two Objectives were the most important ones in the study and would have allowed the Program to prioritize future efforts to minimize entrainment of both endangered and other native fishes in the San Juan and Animas rivers. Inclusion of the reasons why these two objectives were removed would allow for a complete and transparent review of this study, as well as help guide future studies. If information cannot be included, I suggest removing both objectives from the report.**
Response	*The absence in the final report of a clear narrative delineating the reasons that selected objectives (present in the original scope of work) were modified or removed subsequent to the award of the contract was noted by several reviewers and has been addressed. We rectified this omission to the final report by adding text (in the Methods Section of the report) that chronicles key dates, participants, and decisions that resulted in a modification of the original title of the project, original scope of work, and exclusion of Objective 1 and Objective 6 from the effort. The San Juan River Basin Recovery Implementation Program's Biology Committee, Recovery Program stakeholders, and the contracting office of the U.S. Bureau of Reclamation directed final changes to the scope of work. As contractors, we assisted in facilitation of these discussions but not in decisions regarding changes in the scope of work. An abbreviated chronology of the changes to the original scope of work follows.* *Soon after the original San Juan and Animas river Diversion contract was awarded, there was strong concern expressed by several Program members regarding some of the Objectives in the study plan as well as concerns regarding the overall scope of the work. The U.S. Bureau of Reclamation (contracting agency) told Program participants that they (USBR) would work with them (Program participants) in an effort to address their concerns while still providing a product (document cataloging diversion structures in the study area) that would be of use to the Program. The U.S. Bureau of Reclamation organized and managed several conference calls with Program member and stakeholders. The goal of those conference calls was to identify specific items of concern in the study plan and to develop mutually agreeable means to address those concerns while proceeding with the broadly stated goals of the project. The first discussion regarding the Objectives of this project were held between the San Juan River Basin Recovery Implementation Program's Biology Committee and Recovery Program stakeholders during a November 3rd 2015 conference call. Key points relayed during that discussion was the discomfort that some stakeholders felt in regards to the objectives that required the contractors to 1) identify the locations (physical structures) where*

	entrainment of fish was occurring and 2) to rank the risk of entrainment of fish by location (physical structure). Program stakeholders and the contract office decided, and reaffirmed during a January 4th conference call with the aforementioned participants, that the study would no longer identify locations where entrainment may occur (Objective 1) and would not prioritize risk of entrainment at each of the sites (Objective 6). After the conference calls, those objectives were considered outside the purview of the project. We (project contractors) did participate in the conference calls (at the request of the contracting office and in an attempt to help facilitate the conversations) and stated that our role was to conduct the work that the Program deemed necessary. The ultimate decision to modify the scope of the work was made by Program representatives, stakeholders, and the contracting office. We have attempted to follow those decisions, provide an accounting of the changes to the original contract that occurred during the tenure of this project, and accommodate the wishes of Program members. *A new section HISTORY OF MODIFICATION OF THE SAN JUAN AND ANIMAS RIVERS DIVERSION STUDY has been added to the report (after INTRODUCTION) that chronicles the history associated with changes in its scope of work, study objectives, study title, and decisions that were made regarding these matters. In addition, we clarify the differences between an entrainment study and a diversion study in the context of the current effort.*

Commenter	Bill Miller 8/5/16
Comment	**On page 3 under "Study Goals" the following statement is made "The goal of this study (Fish Entrainment on the San Juan and Animas Rivers, a.k.a. the "Animas and San Juan Rivers Diversion Study") is to produce a stand-alone document that provides a complete listing and risk evaluation of entrainment and impingement hazards to endangered fish in the Animas and San Juan Rivers."** **Further down on that same page the report states:** **"As described in the Methods section below, during execution of the scope of work, the study objectives were curtailed to exclude:** **• Identification of specific features among diversion sites where entrainment and/or impingement could be a potential threat to endangered fish; and** **• Entrainment risk prioritization among diversion sites."** **It appears from this latter statement that the main objective of the study as originally designed was eliminated and not achieved. Part of the original basis for the study was a request from the Biology Committee to have further investigation of entrainment in the basin (For example see August 2014 BC meeting summary). The discussion regarding fish passage at Animas River diversions has been discussed by the BC over the past several years. Eliminating the entrainment threat from the analysis and report is a major omission from the original purpose. I recommend that the entrainment analysis be included as originally specified in the Scope of Work.**
Response	*Please see our "response" (above) to a comment we received from Mathew Zeigler (NMDGF) that is almost identical to the comment (above) that you submitted.* *You are correct in your recapitulation of information in the report. As you noted, there was a fundamental shift in the project from one title "Fish Entrainment in the San Juan and Animas Rivers" to a one retitled "San Juan and Animas rivers Diversion Study." The current final report contains all of the raw data regarding physical aspects of the diversion structures as well as the information on endangered fish populations that would have been included in the "Entrainment" report. The level of analysis and interpretation of those data are much reduced compared to what would have been done under the original scope of work.* *In the San Juan River Basin Recovery Implementation Program, scopes of work do not usually undergo major modifications after they are awarded as a contract. In this case of this study, however, the original scope of work (as well as title of the project)* ***was modified*** *following the award of the contract. Modifications to the scope of work were made by the contracting office (USBR) in consultation with the San Juan River Basin Recovery Implementation Program Office. Likewise, San Juan River Basin Biology Committee members*

	participated in the conference calls referenced above (see response to comment submitted by Mathew Zeigler) wherein the changes to the scope of work and specific objectives you reference initiated. *Our (contractors) responsibility was to conduct the work delineated by the Program and document the complicated chronology associated with the changing contract and scope of work. While we appreciate many of the concerns that you expressed, it is important to differentiate those items that are the responsibility of the contractors and those that are outside of the realm of the contractors. Clearly, the modification of the original scope of work, the resultant changes in data presentation and analysis, and the reporting limitations you noted (above) are not the responsibility of the contractors but instead are within the purview of Program members.* *A new section HISTORY OF MODIFICATION OF THE SAN JUAN AND ANIMAS RIVERS DIVERSION STUDY has been added to the report (after INTRODUCTION) that chronicles the history associated with changes in its scope of work, study objectives, study title, and decisions that were made regarding these matters. In addition, we clarify the differences between an entrainment study and a diversion study in the context of the current effort.*
Commenter	Bill Miller 8/5/16
Comment	**The report lacks a conclusion section that addresses each of the objectives. The report should be revised to address each objective.**
Response	*We have rewritten the discussion section of the final report and it contains a concise addressing of each of the study objectives (as you suggest). As noted in the report, Objectives 1 and 6 in the original Scope of Work were omitted. So those objectives are not addressed in the report. Objectives (2-5) are briefly addressed in the Results section, with Objective 7 being addressed in the Discussion section.*
Commenter	Bill Miller 8/5/16
Comment	**The Appendices are not formatted for standard printers. As formatted, the tables in the Appendices are unreadable when printed, even on 11 x 17 format printers. The tables should be reformatted to print on standard format printers in a standard font no smaller than 10 point.**
Response	*Originally, the appendices were going to be distributed separately from the body of the report. One of the reasons we were going to do that was to ensure that the size of the document was not so large as to limit the ability to distribute it electronically. We have now made several changes so that as much of the information as possible is now presented in the document as opposed to in stand-alone appendices.* *The FINAL document is composed of two parts (two separate pdf files each about 13 MB). Part 1 is the report and Appendices A and B. Part 1 now contains all information (all appendices) except for the large-scale aerial photographs of diversion sites. Those maps (Appendix C) are Part 2 (of 2) of the final report.*

	Regarding the inclusion of Appendix A in the final version of the document and the small size of the print: *We modified Appendix A (removing rows, editing text, and enlarging the font as much as possible so that we could get that appendix into the report. While the printed text is very small, it is readable and very visible on screen at 125-200%. Presenting the information in this fashion was the only meaningful way that this appendix could be presented. Readers of the document will still have the option of accessing the excel file used to generate Appendix A.* *Appendix B (ground level photographs of diversion structures) is also included in part 1 of the FINAL version of the report. Appendices D and E from the draft version of the report (volume of water diverted) have been reconfigured and are now included in the RESULTS section of the final report. Information used to generate these tables as well as the daily volumes of water diverted are still available as an excel file. The excel spreadsheets being provided as project deliverables to the USBR will also be available to everyone via download at the Program website.*